

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of detecting sulphur dioxide clouds comprising:

5 measuring infrared radiation at a viewing elevation at or above the horizon and at a key wavelength at which there is a sulphur dioxide feature and in the vicinity of which there is a region where the amount of infrared radiation from water vapour in the atmosphere varies in 10 accordance with a predetermined relationship;

measuring radiation at two or more subsidiary wavelengths in said region;

15 determining the amount of radiation from water vapour at the key wavelength from the measured radiation at the subsidiary wavelengths using the predetermined relationship; and

20 determining whether a sulphur dioxide cloud is present from the measured infrared radiation at the key wavelength and the determined amount of radiation from water vapour.

2. A method as claimed in claim 1, wherein said method is performed from a position or position where the water vapour path amount is less than 1g cm^{-2} .

25 3. A method as claimed in claim 1, wherein said subsidiary wavelengths are located either side of said key wavelength.

30 4. A method as claimed in claim 1, wherein said key wavelength is one of $7.3\mu\text{m}$ and $8.6\mu\text{m}$.

5. A method as claimed in claim 1, wherein the key wavelength is $7.3\mu\text{m}$.

35 6. A method as claimed in claim 4, wherein subsidiary wavelengths at $\pm 0.5\mu\text{m}$ are used.

7. A method as claimed in claim 5, wherein subsidiary wavelengths at $\pm 0.5\mu\text{m}$ are used.

5 8. A method as claimed in claim 5, wherein determining the amount of the radiation from water vapour at the key wavelength is performed by a linear interpolation based on the radiation measured at the subsidiary wavelengths.

10 9. A method as claimed in claim 1, further comprising compensating for background sulphur dioxide in the atmosphere.

15 10. A method as claimed in claim 1, wherein said method is performed from an aircraft.

11. A method as claimed in claim 2, wherein said method is performed from the ground.

20 12. A detection apparatus for detecting a sulphur dioxide cloud comprising:

measurement means that measures infrared radiation at a viewing elevation at just below, or above the horizon and at a key wavelength at which there is a sulphur dioxide feature and in the vicinity of which there is a region where the amount of infrared radiation from water vapour in the atmosphere varies in accordance with a predetermined relationship, said measurement means also measuring infrared radiation at two or more subsidiary wavelengths in said region; and

processing means for determining the amount of radiation from water vapour at the key wavelength from the measured radiation at the subsidiary wavelengths using the predetermined relationship and determining whether a sulphur dioxide cloud is present from the measured infrared radiation at the key wavelength and the determined amount of radiation from water vapour; and

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output means for generating an output signal indicative of the presence of a sulphur dioxide cloud when a sulphur dioxide cloud is present.

5 13. Apparatus as claimed in claim 12, wherein said subsidiary wavelengths are located either side of said key wavelengths.

10 14. Apparatus as claimed in claim 12, wherein said key wavelength is one of $7.3\mu\text{m}$ and $8.6\mu\text{m}$.

15. Apparatus as claimed in claim 12, wherein the key wavelength is $7.3\mu\text{m}$.

15 16. Apparatus as claimed in claim 14, wherein said subsidiary wavelengths are at $\pm 0.5\mu\text{m}$.

17. Apparatus as claimed in claim 15, wherein said subsidiary wavelengths are at $\pm 0.5\mu\text{m}$.

20 18. Apparatus as claimed in claim 15, wherein determining the amount of the radiation from water vapour at the key wavelength is performed by a linear interpolation of the radiation measured at the subsidiary wavelengths.

25 19. Apparatus as claimed in claim 12, wherein said processing means compensates for background sulphur dioxide in the atmosphere.

30 20. An aircraft having a detection apparatus as claimed in claim 12.